Summary of Stormwater/Green Infrastructure Analysis

The sewer systems within census tract 422 include both combined and separate, with approximately 40 acres of the census tract draining to an existing separate storm system on Park Drive. The traditional curb, inlet, and pipe system was designed around controlling the quantity of rainfall runoff in the roadway section. The topography of the tract is highest in elevation in the northeast portion. From a stormwater infrastructure perspective, capturing rainfall runoff at its source provides the most cost-effective means of managing both the quantity and quality of the stormwater. The highest impervious areas within the tract are the streets themselves. There are opportunities to expand on the existing storm system on Park Drive, a neighborhood connection between Central Ave and I-70, to provide multi-benefits to the surrounding neighborhood, including:

- Defined connection between Clifton Park and City Park
- Enhanced pedestrian crossing safety at street intersections on Park Drive using bump-outs for multi-benefit, including traffic-calming measures
- Designated parking areas within the road cross section
- Promoted capture and infiltration of the most frequent rainfall events from the highest impervious areas in the tract: the streets.

This expansion could take on the form of constructed curb extensions, or 'bump-outs', within the existing Park Drive cross section at each cross road intersection where stormwater is already collected: 21st St, 22nd St, 23rd St, 24th St, 25th St, and 26th St, Grandview Blvd, and midblock. The curb extensions would capture the rain before it enters the inlet - this rainwater carries with it pollutants that typically make their way downstream to the Kansas River. The extensions provide a stormwater quality benefit to the community by infiltrating this rainwater instead of conveying it to the Kansas River. They provide a traffic calming effect within the road cross section as a driver sees a narrowing of the road width and will slow down. With the extension into the existing road section, they also provide less exposure of pedestrians to vehicles by reducing the pedestrian crossing distance across Park Drive. Figure 1 shows between 30 and 35 curb extension opportunities on Park Drive from 19th St to Grandview Road. These curb extensions could look similar to the examples shown in Figure 2. To compliment these extensions, a bioswale and/or bioretention facility could complement the existing entrance and parking at City Park along Park Ave. Figure 3 shows an example of a bioswale facility at a park.

The existing cross section of Park Drive includes sidewalks on both sides of the road, on-street parallel parking between 19th Street and 26th Street, and two-way traffic with a dedicated turn lane. The sidewalk currently extends from Clifton Park to City Park and Reagan Park, providing an opportunity to expand on the 'mapped' connection of these parks with a very specific pedestrian connection. Curb extensions can complement and enhance this pedestrian connection by increasing green space within the road corridor. Extensions can be planted with low grasses, and depending on the location, with trees to enhance the tree canopy. For this corridor, we envision low maintenance vegetation decided on by the neighborhood.

This vegetation could be extended into the existing parks on both the east and west ends of Park Drive, providing a cohesive appearance. City Park and Reagan Park currently have very defined uses, including baseball and soccer fields. Clifton Park provides an opportunity to explore a new purpose within the neighborhood, which may include bike trails, urban agriculture, or defined play spaces. Clifton Park does experience a dramatic topographic change between Riverview Ave and Ridge Drive. There are

opportunities to promote stormwater infiltration within the park itself; however, a significant portion of drainage is bypassing the Park, being conveyed within the street section of Park Drive to the west toward City Park. An option in lieu of curb extensions for the portion of Park Drive between 19th and 23rd St is to convey stormwater south through Clifton Park. The existing storm system at Park Drive and 23rd St could be rerouted south into a new dry creek bed feature through the Park, similar to Figure 4. The dry creek bed could lead to a more substantial infiltration feature, such as the bioretention facility shown in Figure 5. A new playground could be integrated with both the dry creek bed and the bioretention facility, similar to the example shown in Figure 6. The surrounding neighborhoods will be instrumental in redefining Clifton Park's purpose.

UG dollars spent within the Park Drive cross section and within each Park would re-establish the community's connection with the Park system, benefit pedestrians and adjoining residents, define specific uses within the existing street cross section, and enhance the aesthetics of the street corridor while promoting both pedestrian and vehicular safety. Similar applications of curb extensions are being constructed in Philadelphia, PA, Columbus, OH, and Kansas City, MO for multi-purposes and benefits.

Figure 1 Green Infrastructure Opportunities on Park Drive: Curb Extensions and Bioswale

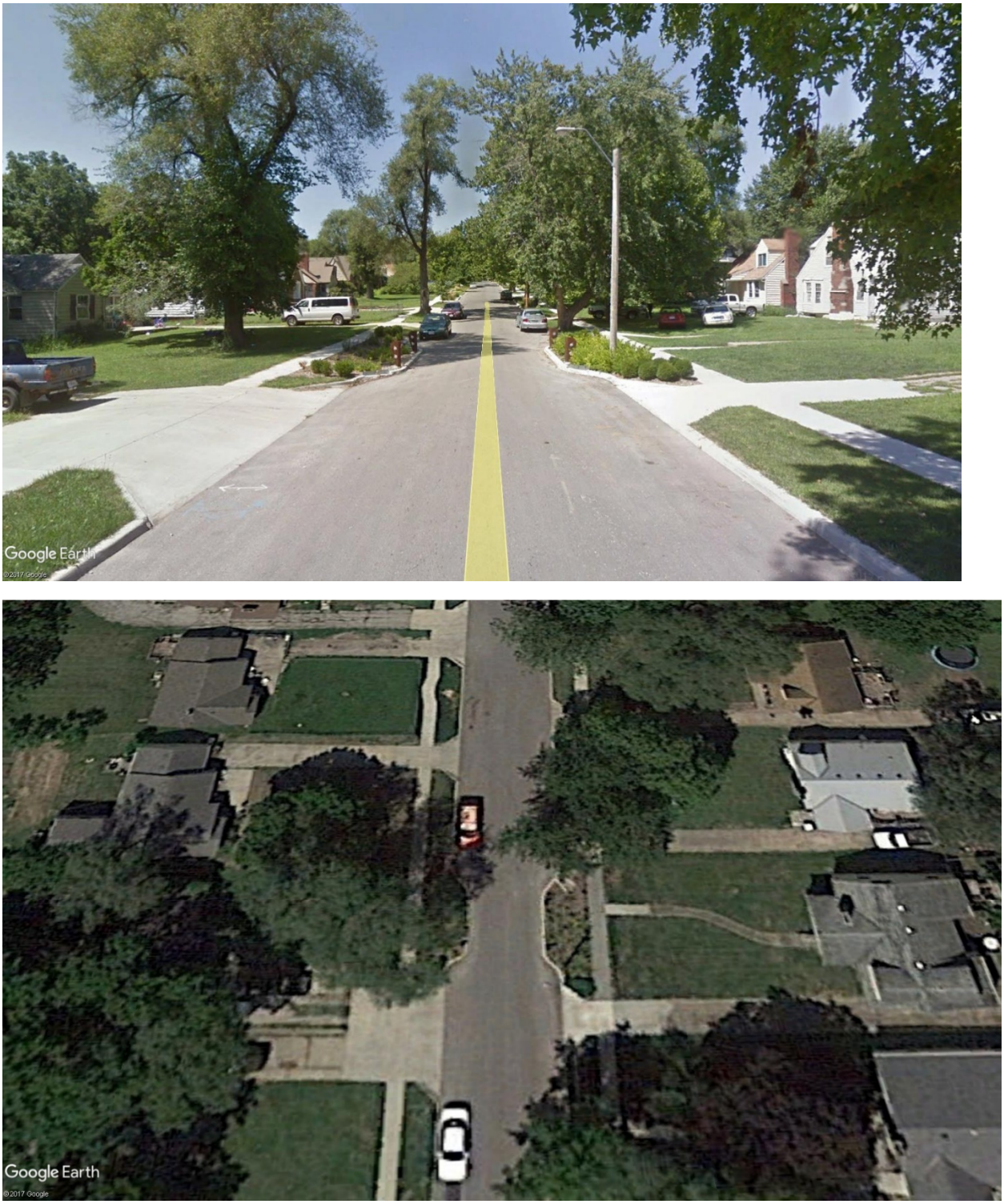

Figure 2 Examples of Curb Extensions in Kansas City, MO (Google Earth Image), Street View and Aerial View

Figure 3 Example of Bioswale Facilities Integrated into a Playground in Lee's Summit (Google Earth) at a Park

Figure 4 Example of Dry Creek Bed for Stormwater Conveyance on Steep Slopes (Arleta Park, Kansas City, MO)

Figure 5 Example of a Bioretention Facility Integrated into a Low Area of a Park (Arleta Park, Kansas City, MO)

Figure 6 Example of Dry Creek Bed and Bioretention Adjoining a Playground (Arleta Park, Kansas City, MO)